



NetLink SVP Server

SVP100

SVP020

SVP010

Installation, Configuration, and Administration

For Cisco and Mitel IP environments

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SpectraLink Corporation
5755 Central Avenue
Boulder, CO 80301
303 440 5330 or
800 676 5465
www.spectralink.com

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Follow these general precautions while installing telephone equipment:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines



Please visit spectralink.com to view regulatory declarations.

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1. About This Document

This document explains how to configure and maintain one or more NetLink SVP Servers (models SVP100, SVP020, SVP010) within IP telephony environments.

1.1 SpectraLink Corporation Model Numbers

This document covers the following registered model number:

SVP100

1.2 Related Documents

NetLink Wireless Telephone: Configuration and Administration
for *Cisco CallManager and IP Phone 7960 Emulation* (72-1082-02)
for *Mitel Networks 3300 and SX-200 ICP with 5220 IP Phone emulation*
(72-1084-02)

Available at <http://www.spectralink.com/resources/manuals.jsp>.

NetLink Wireless Telephone WLAN Compatibility List (72-9000-00)
Access Point Configuration Note (72-99xx-00 where xx indicates a number
corresponding to the type of access point.). Available at
http://www.spectralink.com/resources/wifi_compatibility.jsp.

Deploying Enterprise-Grade Wi-Fi Telephony white paper.
Available at http://www.spectralink.com/resources/white_papers.jsp.

1.3 Customer Support Hotline

SpectraLink wants you to have a successful installation. If you have questions please contact the Customer Support Hotline at (800) 775-5330. The hotline is open Monday through Friday, 6 a.m. to 6 p.m. Mountain time.

1.4 Icons and Conventions

This manual uses the following icons and conventions.



Caution! Follow these instructions carefully to avoid danger.



Note these instructions carefully.

NORM

This typeface indicates a key, label, or button on the NetLink SVP Server.

2. NetLink SVP Server Overview

The NetLink SVP Server is an Ethernet LAN device that works with access points (APs) to provide QoS on the wireless LAN. Voice packets to and from the NetLink Wireless Telephones are intercepted by the NetLink SVP Server and encapsulated for prioritization as they are routed to and from an IP telephony server.

2.1 SpectraLink Voice Priority (SVP) and Quality of Service

SpectraLink Voice Priority (SVP) is the SpectraLink quality of service (QoS) mechanism that is implemented in the wireless telephone and AP to enhance voice quality over the wireless network. SVP gives preference to voice packets over data packets on the wireless medium, increasing the probability that all voice packets are transmitted efficiently and with minimum delay. SVP is fully compatible with IEEE 802.11b standards.

NetLink Wireless Telephones support basic WMM (Wi-Fi Multimedia) if also supported by the AP as part of the 802.11e protocol. If the AP supports WMM, the wireless telephone automatically discovers and uses it. WMM does not replace the NetLink SVP Server.

2.2 SVP Server Models

The SVP Server is available in three models. Which model is selected for your facility depends on current and expected capacity. All SVP Servers within a subnet must be the same model type.

- SVP100: Serves 80 calls simultaneously.
- SVP020: Serves 20 powered-on handsets.
- SVP010: Serves 10 powered-on handsets.

See the following capacity tables for multiple SVP Server system capacities.

All SVP Server models are installed, configured and administered according to the instructions in this document. The model information is available on the Software Version screen. See section 7.3 *Software Version*.

2.3 The Timing Function

NetLink SVP Servers provide the connection or "gateway" to the IP PBX for the wireless telephones and the "timing" function for active calls. This "gateway" function is distributed across the SVP Servers.

The number of active SVP Servers is determined dynamically. Whenever SVP Servers are added to or removed from the system, the distribution of the "timing" function for active calls is affected.

2.4 Internal Gatekeeper

A gatekeeper is required in certain H.323 protocol systems. The gatekeeper that resides on the SVP Server is designed for small applications using the NetLink Wireless Telephones under the H.323 protocol.

The internal gatekeeper is not designed to scale beyond the capacity of a single SVP Server and does not provide the advanced features required for larger installations. It has a limit of 1000 registration records.

2.5 Multiple SVP Servers/Master SVP Server

Multiple SVP Server environments are those which have more than one NetLink SVP Server. Up to four SVP010 models or up to two SVP020 models may be installed in any one subnet. Up to 16 models of SVP100 Servers may be installed in any one subnet. All SVP Servers must be in the same subnet.

In a system comprised of multiple SVP Servers, a master SVP Server must be identified. The master SVP Server must have a static IP address. The wireless telephones and the other SVP Servers locate the master by using a static IP address, DHCP, or DNS.

The master SVP Server performs important coordinating functions. The loss of a non-master SVP Server does not significantly affect the operation of the remaining SVP Servers but results in the re boot of all handsets. However, the loss of the master SVP Server results in a loss of all communication between all of the SVP Servers. This also means that the loss of the master SVP results in the loss of all active calls and wireless telephones cannot check in until communication with the master is reestablished.

2.6 Multiple NetLink SVP Server Capacities

The system capacity of each SVP Server model is shown in the tables below. Note that SVP Server models may not be combined within one subnet.

NetLink SVP010 and SVP020 Server Capacity

The system capacity of the SVP010 and SVP020 is measured by number of powered-on handsets. If this number exceeds the maximum, the handset that cannot be served will display an error and will not connect to the SVP Server. Other handsets will not be affected.

Number of SVP Servers	Number of handsets	
	SVP010	SVP020
1	10	20
2	20	40
3	30	N/A
4	40	N/A

NetLink SVP100 Server Capacity

The capacity of the SVP100 Server is determined by active calls. The table below shows the capacity of an IP gateway in a multiple-SVP Server environment. The table shows the total possible calls at 100% active calls. However, since it is unlikely that all handsets will be in use at the same time, the table then analyzes the number of handsets that could be installed in any given system where 10%, 15% or 20% of the handsets are in active calls at any one time. The calculations are not linear due to

the Erlang¹ calculation for telephony traffic. The possible installed handsets figures are approximate and meant as a guideline and not as an absolute recommendation for any facility.

Number of SVP Servers	Number of calls possible per Server	Total possible installed handsets @ 100% in active calls	Erlang	Possible installed handsets		
				@ 10% in active calls	@ 15% in active calls	@ 20% in active calls
1	80	80	65	500	433	325
2	64	128	111	1000	740	555
3	60	180	160	1500	1067	800
4	58	232	211	2000	1407	1055
5	57	285	262	2500	1747	1310
6	56	336	312	3000	2080	1560
7	56	392	367	3500	2447	1835
8	55	440	415	4000	2767	2075
9	55	495	469	4500	3127	2345
10	55	550	524	5000	3493	2620
11	55	605	578	5500	3853	2890
12	54	648	621	6000	4140	3105
13	54	702	674	6500	4493	3370
14	54	756	728	7000	4853	3640
15	54	810	782	7500	5213	3910
16	54	864	836	8000	5573	4180

¹ An *Erlang* is a unit of telecommunications traffic measurement. Strictly speaking, an Erlang represents the continuous use of one voice path. In practice, it is used to describe the total traffic volume of one hour.

Erlang traffic measurements are made in order to help telecommunications network designers understand traffic patterns within their voice networks. This is essential if they are to successfully design their network topology and establish the necessary trunk group sizes.

Erlang traffic measurements or estimates can be used to work out how many lines are required between a telephone system and a central office (PSTN exchange lines), or between multiple network locations.

Please visit www.erlang.com for additional information.

2.7 Notes on System Configuration



In an IP system using subnets to differentiate telephony areas, each subnet must have its own APs. Each subnet may require an SVP Server to maintain voice quality, but this depends on traffic volume and router capacity.

Multiple SVP Server environments are those which have more than one SVP Server. A master SVP Server must be identified in a multiple-SVP Server environment.

SVP Server models may not be combined within one subnet. More than one SVP Server model type may be used within a facility if installed on different subnets.

Wireless telephones cannot roam with uninterrupted service between subnets unless specific LAN components are present. Certain AP/Ethernet switch combinations establish a layer-2 tunnel across subnets that enables the handsets to roam. Without this capability, any call in progress will be dropped when the user moves out of range and the handset must be power cycled in order to resume functionality in the new subnet area.

Please see *Deploying Enterprise-Grade Wi-Fi Telephony* for detailed configuration information when installing multiple SVP Server models across several different subnets.



IP multicast addresses are used when NetLink i640 and 8030 Wireless Telephones are installed. This requires that multicasting be enabled on the subnet used for the NetLink Wireless Telephones, SVP Server, and telephony gateways.

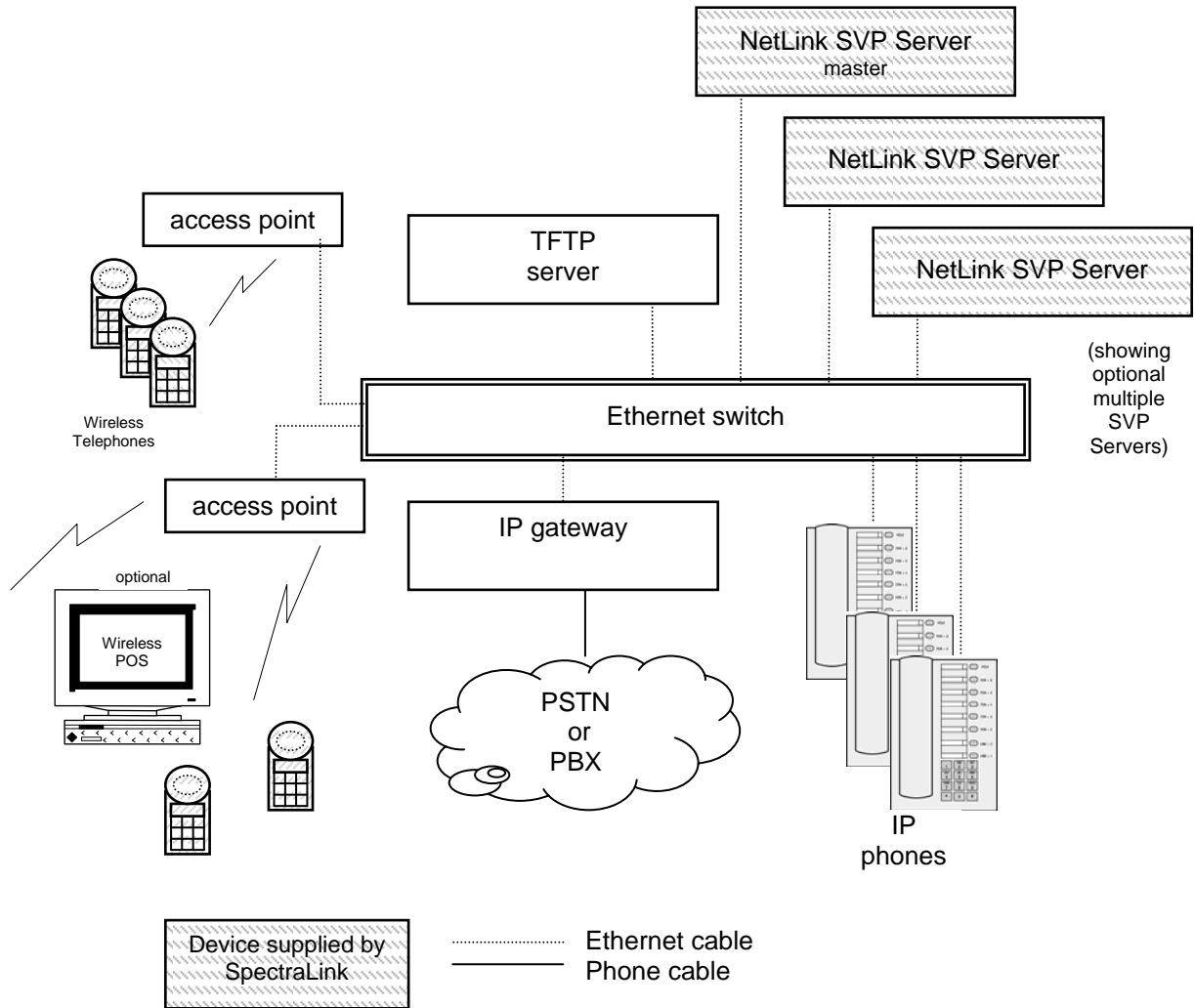
Routers are typically configured with filters to prevent multicast traffic from flowing outside of specific domains. The wireless LAN can be placed on a separate VLAN or subnet to reduce the effects of broadcast and multicast traffic from devices in other network segments.



The NetLink SVP Server requires a Cat. 5 cable connection between its network port and the Ethernet switch. The NetLink SVP Server auto-negotiates to the type of port on the Ethernet switch and supports 10Base-T, 100Base-T, full-duplex and half-duplex port types.

2.8 System Diagram

The following diagram shows multiple NetLink SVP Servers residing on a network with an IP telephony gateway and IP telephony server, wireless LAN APs, and Ethernet switch:



(IP telephony system example)

2.9 System Components

NetLink e340/h340/i640 and 8000 Series Wireless Telephones

Employees can carry wireless telephones to make and receive calls as they move throughout the building. The wireless telephones are to be used on-premises; they are not cellular or satellite phones. Just like wired telephones, they can receive calls directly, receive transferred calls, transfer calls to other extensions, and make outside and long distance calls (subject to the restrictions applied in your facility.)

Access points

Supplied by third party vendors, APs provide the connection between the wired Ethernet LAN and the wireless (802.11) LAN. APs must be positioned in all areas where wireless telephones will be used. The number and placement of APs will affect the coverage area and capacity of the wireless system. Typically, the requirements for use of NetLink Wireless Telephones are similar to those of wireless data devices. Contact SpectraLink, or a certified SpectraLink distributor, for specific information about your facility's needs.

The NetLink system must connect to APs that utilize SpectraLink Voice Priority (SVP). Contact SpectraLink, or a certified SpectraLink distributor, to verify that your AP and its software version are supported.

Ethernet switch

A component in the wired Ethernet LAN infrastructure. Switches interconnect multiple network devices, including APs and other components. Ethernet switches are required to provide the higher performance network connections needed to handle combined voice and data traffic.

Router

A router is an optional component in the wired Ethernet LAN infrastructure that separates a wired LAN into segments so that network traffic is restricted to those segments that are directly involved in the communication. Installation of a network router is recommended in larger networks, where there may be significant network traffic not related to the wireless LAN. A router will isolate the wireless LAN from the associated wired LAN so that they are not impacted by each others' traffic. The NetLink SVP Servers, the APs, and their associated Ethernet switch must all be on the same "side" of the router.

NetLink SVP Server

The NetLink SVP Server manages call network traffic as detailed in this document.

Administrative computer

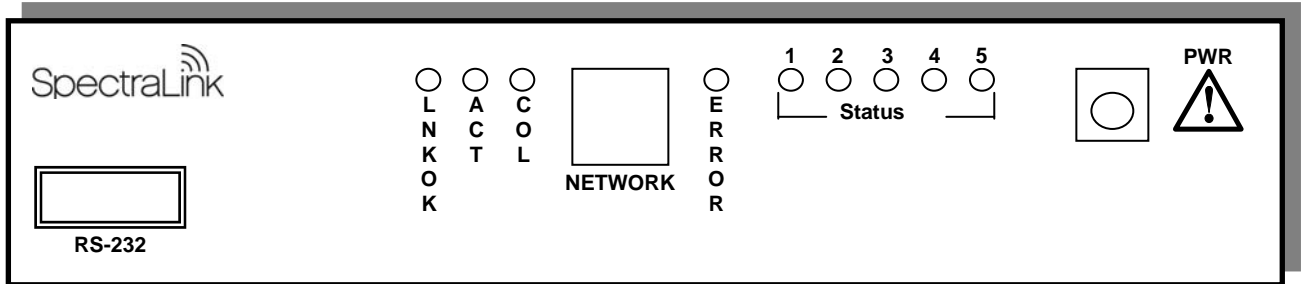
An administrative computer is required for setup and maintenance of the NetLink SVP Server. This computer may be temporarily connected directly to the component or to the network; a dedicated computer is not required. Some installations use a laptop to configure and maintain system components.

TFTP Server

Required in an IP system to distribute software to the wireless telephones and SVP Server. May be on a different subnet than the IP gateway, IP telephony server, and APs.

2.10 The Front Panel of the NetLink SVP Server

The NetLink SVP Server's front panel contains ports to connect to power, the LAN, and to an administrative computer via an RS-232 port. Status LEDs supply information about the NetLink SVP Server's functioning.



RS-232 Port: male DB-9 connector (DTE) used for RS-232 connection to a terminal, terminal emulator, or modem for system administration.

Link LEDs:

LNKOK: Lit when there is a network connection.

ACT: Lit if there is system activity.

COL: Lit if there are network collisions.

NETWORK: Port to wired (Ethernet) LAN.

ERROR: Lit when the system has detected an error.

STATUS: Indicate system error messages and status.

1: Heartbeat, indicates gateway is running.

2: If active calls.

3, 4, 5: Currently unused.

PWR (power jack): Connects to the AC adapter supplying power to the system.



Use only the SpectraLink-provided Class II AC Adapter with output 24VDC, 1A.

Note that the model designation may be found on the label which is on the side of the SVP Server.

3. Installing the NetLink SVP Server

As shown in the system diagram, the NetLink SVP Server is connected to the Ethernet switch. The specifications covered here allow for great flexibility in physical placement of the components within stated guidelines.

See the *Configuration and Administration* document for your vendor's IP system for information on LAN requirements, network infrastructure and IP addressing.

3.1 Required Materials

The following equipment must be provided by the customer.

- **Power Outlet** – AC adapter provided by SpectraLink..
- **Backboard space** – the NetLink SVP Server is designed to be wall-mounted to $\frac{3}{4}$ " plywood securely screwed to the wall.
- **Screws** – required to mount the NetLink SVP Server to the wall. Four #8 $\frac{3}{4}$ " panhead wood screws (or similar device) are required.
- **Cat. 5 Cable** – RJ-45 connector at the NetLink SVP Server. Connection to Ethernet switch.

3.2 Locate the NetLink SVP Server

The NetLink SVP Server measures approximately 4 x 12.5 x 7 inches, and weighs about five pounds. The unit can be wall-mounted, vertically or horizontally, over $\frac{3}{4}$ " plywood. The SVP Server can also be rack-mounted using a rack-mount kit (sold separately).

Locate the NetLink SVP Server in a space with:

- Sufficient backboard mounting space (for wall mount) and proximity to the LAN access device (switched Ethernet hub) and power source.
- Easy access to the front panel, which is used for cabling.
- A maximum distance of 325 feet (100 meters) from the Ethernet switch.

3.3 Install the NetLink SVP Server

The NetLink SVP Server may be mounted on a rack or to a wall.

Mount the SVP Server on a rack

The rack-mount kit is designed for mounting equipment in a standard 19-inch rack and should contain the following equipment:

- Mounting plates – two for each SVP Server to be mounted.
- Screws – four rack-mount screws for each SVP Server to be mounted.

To rack-mount the NetLink SVP Server:

Remove the corner screws from the SVP Server.

Screw the U-shaped end (round screw holes) of the two mounting plates to the SVP Server.

Screw the other end of the two mounting plates (oblong screw holes) to the rack.

Repeat steps 1-3 for each additional SVP Server. The mounting plate is designed to provide the correct minimum spacing between units. When mounting multiple units, stack the units in the rack as closely as possible.

Mount the NetLink SVP Server to a wall

The NetLink SVP Server can be mounted either horizontally or vertically.

To mount the NetLink SVP Server to a wall:

1. Using a 1/8-inch drill bit, drill four pilot holes, on 1.84-inch by 12.1-inch centers (approximately equivalent to 1-13/16" by 12-1/8").
2. Insert the #8 3/4-inch screws in the pilot holes and tighten, leaving a 1/8-inch to 1/4-inch-gap from the wall.

Connect NetLink SVP Server to LAN

Using a Cat. 5 cable, connect the **NETWORK** port on the NetLink SVP Server to the connecting port on the Ethernet switch.

Connect Power

1. Connect the power plug from the AC adapter to the jack labeled PWR on the NetLink SVP Server.



Use only the provided Class II AC Adapter with output 24VDC, 1A.

2. Plug the AC adapter into an 110VAC outlet to apply power to the NetLink SVP Server.
3. The system will cycle through diagnostic testing and the LEDs will blink for about one minute. When the system is ready for use:
 - The **ERROR** LED should be off.
 - **Status 1** should be blinking.

4. Configuring the NetLink SVP Server

During initial setup of the NetLink SVP Server the IP address is established and the maximum number of active calls per AP is set. Optionally, you may enter a hostname and a location for software updates via TFTP.

4.1 Connecting to the NetLink SVP Server

The initial connection to the NetLink SVP Server must be made via a serial connection to establish the NetLink SVP Server's IP address. After the IP address is established, connection to the NetLink SVP Server may be done via the network using telnet. It is recommended that the basic setup actions occur while the serial connection is made.

Connect via the Serial Port

1. Using a DB-9 female, null-modem cable, connect the NetLink SVP Server to the serial port of a terminal or PC.
2. Run a terminal emulation program (such as HyperTerminal™) or use a VT-100 terminal with the following configuration:

Bits per second: 9600

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

3. Press Enter to display the NetLink SVP Server login screen.
4. Enter the default login: admin and default password: admin. These are case sensitive.

The **NetLink SVP-II System** menu will display.

Connecting Via Telnet



Telnet can only be used after the NetLink SVP Server's IP address is configured.

The telnet method of connection is used for routine maintenance of the NetLink Server for both local and remote administration, depending on your network.

To connect via telnet, run a telnet session to the IP address of the NetLink SVP Server. Once you connect and log in, the **NetLink SVP-II System** menu displays.

4.2 The NetLink SVP-II System Menu

The main menu displays as shown here:

```
NetLink SVP-II System
Hostname: [SUPV2_1], Address: 10.8.0.61

System Status
SUP-II Configuration
Network Configuration
Change Password
Exit

Enter=Select      ESC=Exit      Use Arrow Keys to Move Cursor
```

System Status

Menu for viewing error messages, status of operation and software code version.

SVP-II² Configuration

Allows you to set the mode and reset the system.

Network Configuration

Allows you to set network configuration options, including IP address and hostname.

Change Password

Allows you to change the password for NetLink SVP Server access.

² SVP-II is a designation used internally by SpectraLink Engineering.

4.3 Network Configuration

The IP address and other network settings are established via the **Network Configuration** screen. This is also where you may optionally establish a hostname and enter the IP address of the location of any software updates you may obtain from SpectraLink. See section 6, the *Software Maintenance* section, of this document for more information about installing software updates via TFTP.

Scroll to **Network Configuration** and select by pressing Enter. A screen similar to the following appears:

```

                                Network Configuration
                                Hostname: [SVPO20_1], Address: 10.8.0.61

Ethernet Address (fixed):      00:90:7A:02:8F:AB
IP Address:                   10.8.0.61
Hostname:                     SVPO20_1
Subnet Mask:                  255.0.0.0
Default Gateway:              10.0.0.90
SVP-II TFTP Download Master:  10.0.0.3
Primary DNS Server:           NONE
Secondary DNS Server:         NONE
DNS Domain:                   NONE
WINS Server:                  10.13.0.1
Workgroup:                    WORKGROUP
Syslog Server:                10.0.0.31
Disable Telnet service:       N
Maintenance Lock:             N

Enter=Change  S=SendAll  ESC=Exit      Use Arrow Keys to Move Cursor
```

Note the navigation options at the bottom of the screen. Press Enter to change a value, ESC to exit the screen, and the arrow keys to move the cursor.

SendAll

In an IP system with multiple NetLink SVP Servers, the **SendAll** option is provided to speed configuration and to ensure identical settings. The **S=SendAll** option allows you to send that configuration parameter to every NetLink SVP Server on the LAN. **SendAll** can only be used after the IP address is established on EACH NetLink SVP Server via the serial connection. If you anticipate identical settings across the LAN, set just the IP address and custom hostname (if desired) for each NetLink SVP Server using the initial serial connection. Then connect via the LAN and use **SendAll** to set identical configuration options for all NetLink SVP Servers.

If **SendAll** is to be utilized in your system, all passwords must be identical. DO NOT CHANGE THE PASSWORD AT THE INITIAL CONFIGURATION IF THE SendAll OPTION IS DESIRED. Use the default password and change it globally if desired after a LAN connection is established for all NetLink SVP Servers.

If independent administration of each NetLink SVP Server is desired, the passwords may be set at initial configuration.



To change the IP address of the master SVP Server, change it in this menu and reboot the system. Then you may change alias IP addresses in each of the other SVP Servers without error.

The following options must be configured:

IP Address

Enter the IP address of the NetLink SVP Server, defined by your network administrator. Enter the complete address including digits and periods. **DHCP** may be entered.



A master SVP Server must have a static IP address.

The NetLink SVP Server will automatically lock for maintenance if the IP address is changed. When this Maintenance Lock occurs, the NetLink SVP Server must be reset upon exit. All active calls are terminated during a reset.

Hostname

(Optional) change the default host name, if desired. This is the name of the NetLink SVP Server to which you are connected, for identification purposes only. You cannot enter spaces in this field.

Subnet Mask

The network administrator must define the subnet mask.

Default Gateway

The IP address of a router on the local subnet.

SVP-II TFTP Download Master

This entry indicates the source of software updates for the NetLink SVP Server. See section 5, the *Software Maintenance* section, for more information. Valid source location entries are:

- **NONE:** disables.
- **IP Address:** The IP address of a network TFTP server that will be used to transfer software updates to the NetLink SVP Server.

DNS server and DNS domain

These settings are used to configure Domain Name services. Consult your system administrator for the correct settings. These can also be set to **DHCP**. This will cause the DHCP client in the NetLink SVP Server to attempt to automatically get the correct setting from the DHCP server. The DHCP setting is only valid when the IP address is also acquired using DHCP.

WINS servers

These setting are used for Windows Name Services. Consult your system administrator for the correct settings. These can also be set to **DHCP**. This will cause the DHCP client in the NetLink SVP Server to attempt to automatically get the correct setting from the DHCP server. The DHCP setting is only valid when the IP address is also acquired using DHCP.



When the name services are set up correctly, the NetLink SVP Server can translate hostnames to IP addresses. Using telnet, it is also possible to access the NetLink SVP Server using its hostname instead of the IP address.

Workgroup

As set in WINS.

Syslog Server

Logging can be set to **Syslog** or **NONE**. If Syslog is set, a message is sent to the syslog server when an alarm is triggered.

Disable Telnet Service

Prevents Telnet access into the SVP Server. Reset the SVP Server for the change to take effect. Upon reset the Telnet protocol server is not started.

The NetLink SVP Server must be reset in order to set the configuration options. If the NetLink SVP Server is in **Maintenance Lock**, you must manually reset it by selecting the **Reset** option in the **SVP-II Configuration** screen and then pressing Y upon exit.

4.4 SVP Server Configuration

The **SVP-II Configuration** screen is where you set the mode of the NetLink SVP Server. It is also where you can lock the NetLink SVP Server for maintenance and reset the NetLink SVP Server after maintenance. The type of gateway you are using determines the mode of the NetLink SVP Server.

From the main menu, scroll to **SVP-II Configuration** and select by pressing Enter.

```

                                SVP-II Configuration
                                Hostname: [SVPII_1], Address: 10.8.0.52

SVP-II Mode:                      Netlink IP
Ethernet link:                    auto-negotiate
System Locked:                    N
Maintenance Lock:                 N
Inactivity Timeout (min):         20
QoS Configuration
Reset
Reset all SVP servers

Enter=Change  S=SendAll  ESC=Exit      Use Arrow Keys to Move Cursor
```

SVP-II Mode

Defaults to **NetLink IP** for an IP environment. Press enter to select and the screen is immediately redrawn with additional options for the IP environment.

```

                                SVP-II Configuration
                                Hostname: [SVPII_1], Address: 10.8.0.52

Phones per Access Point:         12
802.11 Rate:                     Automatic
SVP-II Master:                   10.8.0.52
First Alias IP Address:          0.0.0.0
Last Alias IP Address:           0.0.0.0
Enable H.323 Gatekeeper:         N
SVP-II Mode:                     Netlink IP
Ethernet link:                   auto-negotiate
System Locked:                   N
Maintenance Lock:                N
Inactivity Timeout (min):         20
QoS Configuration
Reset
Reset all SVP servers

Enter=Change  S=SendAll  ESC=Exit      Use Arrow Keys to Move Cursor
```

The following options must be configured:

Phones per Access Point

AP specifications are detailed in the *Configuration Notes* for each brand and type. Refer to these notes when entering the number of simultaneous calls supported for your type.

802.11 Rate

Select 1MB/2MB to limit the transmission rate between the wireless telephones and APs. Select **Automatic** to allow the wireless telephone to determine its rate (up to 11 Mb/s).

SVP-II Master

The master SVP Server must be identified in an IP system. Select one of the following identification options:

- Statically configure the IP address of the master SVP Server in each of the SVP Servers. Enter the IP address.



See the Overview section for an explanation of the master SVP Server.

- Statically configure the IP address of the master SVP Server in a DHCP server and configure each of the SVP Servers to get the information from the DHCP server. Enter DHCP. If DHCP is used, the IP address of the master SVP Server must be configured in the DHCP server. See the wireless telephone interface document for your IP environment for more information about DHCP integration factors.
- Statically configure the IP address of the master SVP Server in a DNS server and configure each of the SVP Servers to retrieve this information from the DNS server. Enter DNS. If DNS is used, the IP address of the master SVP Server must be configured in the DNS server.

First Alias IP Address/Last Alias IP Address

The SVP Server uses an IP address when acting as a proxy for the wireless telephone. Therefore, one alias IP address is required for every installed NetLink Wireless Telephone. These IP addresses must be entered as a range and must be assigned solely for this purpose.

When multiple SVP100 Servers are installed, a different range must be configured in each SVP Server. In determining how many addresses to configure per SVP Server, use this formula: $(\# \text{ of handsets} / \# \text{ of SVP Servers}) + 30\%$. This formula will accommodate the possibility of unequal distribution of handsets among the available SVP Servers.



All alias addresses must be on the same subnet as the SVP Server and cannot be duplicated on other subnets or SVP Servers. There is no limit to the number of addresses that can be assigned, but the capacity of each SVP Server is 500 wireless telephones.



Alias IP Addresses are not necessary in Cisco systems.

Enable H.323 Gatekeeper

In certain H.323 protocol systems, the SVP Server may function as a gatekeeper. Enter **Y** to have the SVP Server function as the gatekeeper in the H.323 protocol environment.

Ethernet link

The SVP Server will auto-negotiate unless there is a need to specify a link speed.

System Locked

This option is used to take the system down for maintenance. The default entry is **N** (No). Set it at **Y** (Yes) to prevent any new calls from starting. Return to **N** to restore normal operation.

Maintenance Lock

The system automatically sets this option to **Y** (Yes) after certain maintenance activities that require reset, such as changing the IP address. Maintenance Lock prevents any new calls from starting. Note that the administrator cannot change this option. It is automatically set by the system. Reset the system at exit to clear Maintenance Lock.

Inactivity Timeout (min)

Set the number of minutes the administrative module can be left unattended before the system closes it. This number can be from 1 to 100. If it is set to zero (0), the administrative module will not close due to inactivity.

QoS Configuration

Select this option to set the DSCP tags. See *QoS Configuration* section below.

Reset System

If this option is selected, you will be prompted to reset the NetLink SVP Server upon exiting this screen.

Reset All SVP Servers

If this option is selected, you will be prompted to reset all SVP Servers upon exiting this screen. This is necessary if you have changed configurations on other SVP Servers by using the SendAll option.



The NetLink SVP Server should be reset at the end of any maintenance procedure that requires a reset either via **Maintenance Lock** or manually via **Reset System**.



Note that resetting the NetLink SVP Server will terminate any calls in progress.

QoS Configuration

DSCP tags set packet priorities for QoS.

```

                                QoS Configuration
                        Hostname: [slnk-03e396], Address: 10.13.0.127

Traffic Class DSCP Tag
-----
Administration Default
WT (In call) Default
WT (Standby) Default
RTP Default
PBX Default
Inter-SVP2 Default

Enter=Change  S=SendAll  ESC=Exit      Use Arrow Keys to Move Cursor

```

DSCP Tag

DSCP (Differentiated Services Code Point) is a QoS mechanism for setting relative priorities. Packets are tagged with a DSCP field in the IP header. The decimal value may be set as a number from 0-63 and may be different for each traffic class listed on the screen.

- **Administration** tags set the priority for telnet, TFTP, and other administrative traffic. Administrative traffic can have the lowest priority because it does not require voice quality.
- **WT (In call)** traffic requires voice quality and may be set to a higher priority than **WT (Standby)** traffic.
- **RTP** traffic is the audio traffic to the IP PBX. It requires voice quality.
- **PBX** traffic is not audio to the PBX.
- **Inter-SVP2** traffic is the information-passing protocol that SVP Servers use to communicate with each other.

When forwarding packets, the SVP Server shall always overwrite the received DSCP value. The final DSCP tag for packets in each of the traffic classes are assigned a DSCP value based on the following rules. (Please see table on next page.)

- If both **Administration** and the **Traffic Class** setting is **Default**, the **Default** value as shown in the table below will be used.
- If **Administration** is set at any number (**Value X**) other than **Default**, that setting (**Value X**) it will override the **Default** value of the **Traffic Class**.

- If any of the **Traffic Class** settings are set at any value (**Value Y**) other than **Default**, that setting (**Value Y**) will override the **Administration** setting.

Traffic Class		Administration	
		Default	Value X
WT (In call) Priority High	Default	4	X
	Value Y	Y	Y
WT (Standby) Priority Med	Default	0	X
	Value Y	Y	Y
RTP Priority High	Default	4	X
	Value Y	Y	Y
PBX Priority Med	Default	0	X
	Value Y	Y	Y
Inter-SVP2 Priority Med	Default	0	X
	Value Y	Y	Y
Administration Priority Low	Default	0	X
	Value Y	Y	Y



Note: Default DSCP settings will mark traffic for Best Effort handling under normal circumstances. Please consider changing these values based on the recommended QoS settings from your network hardware manufacturer to achieve prioritization for your voice traffic..

4.5 Change Password

If desired, the password to access the NetLink SVP Server may be changed.

A password must meet the following requirements:

- It must be more than four characters, but cannot exceed 16 characters.
- The first character must be a letter.
- Numbers or letters are allowed.
- No dashes, spaces, or punctuation marks, etc. are allowed.

Select **Change Password** from the main menu. A screen similar to the following will appear:

Change Password
Hostname: [SUPV2_1], Address: 10.8.0.61

Old Password	*****
New Password	*****
Confirm New Password	*****
Set Password	
Set Password on all SVP servers	

Enter=Select ESC=Exit Use Arrow Keys to Move Cursor

Enter the information and either select **Set Password** or press the **S** key to set the new password.

If you forget a password, call SpectraLink Customer Service for assistance.

5. Swapping/Adding/Deleting SVP Servers

Whenever an SVP Server is removed from the system, wireless telephones that are using the SVP Server will be affected. If the removal of the SVP Server is intentional, the administrator should lock and idle the system prior to removing an SVP Server.

Adding an SVP Server

A new SVP Server is detected within two seconds of being added to the system (booted/configured/connected). When detected, any wireless telephone not active in a call will immediately be forced to reboot and check in again. Any wireless telephone in a call will immediately switch to the SVP Server that should provide its "timing" function. This switch should not be noticeable to the user since it is similar to a normal handoff between APs. When the wireless telephone ends the call, it will be forced to reboot and check in again.

Removing an SVP Server

When an SVP Server is removed from the system it is detected within two seconds. Wireless telephones not in calls are immediately forced to reboot and check in again. For wireless telephones active in calls, two possible scenarios can occur. If the SVP Server that was removed was providing the "gateway" function for the wireless telephone, then the call is lost and the wireless telephone is forced to check-in again. If the SVP Server that was removed was providing the "timing" function for the call, the call will switch to the SVP Server that should now provide the "timing" function. Note that during the two seconds while the loss of the SVP Server is being detected, the audio for the call will be lost.

Changing the Master SVP Server

In the event the master SVP Server loses communication with the network, the wireless telephone system will fail. All SVP Servers will lock, All calls will be lost, and no calls can be placed. Therefore, if the master SVP Server needs to be replaced, be sure the system can be brought down with minimal call interruption. Be sure to reset all SVP Servers after the master has been replaced. If the IP address of the master is changed, it must be changed in all SVP Servers.

6. Software Maintenance

The NetLink SVP Server uses proprietary software programs written and maintained by SpectraLink Corporation. The software versions that are running on the system components can be displayed via the **System Status** screen.

You may obtain information about software updates from SpectraLink or its authorized dealer.

At startup the NetLink SVP Server uses TFTP to check the software version it is running against the version in the TFTP location. If there is a discrepancy, the NetLink SVP Server will download the version in the TFTP location. See the *Configuration and Administration* document for your vendor's IP system for more information about using TFTP.

Software Updates

Lock the NetLink SVP Server in the **SVP-II Configuration** screen prior to updating the software. In multiple SVP Server systems, all SVP Servers must be locked and upgraded at the same time.

Downloads for the NetLink SVP Server are available from Available from <http://www.spectralink.com/softwareUpdates>.

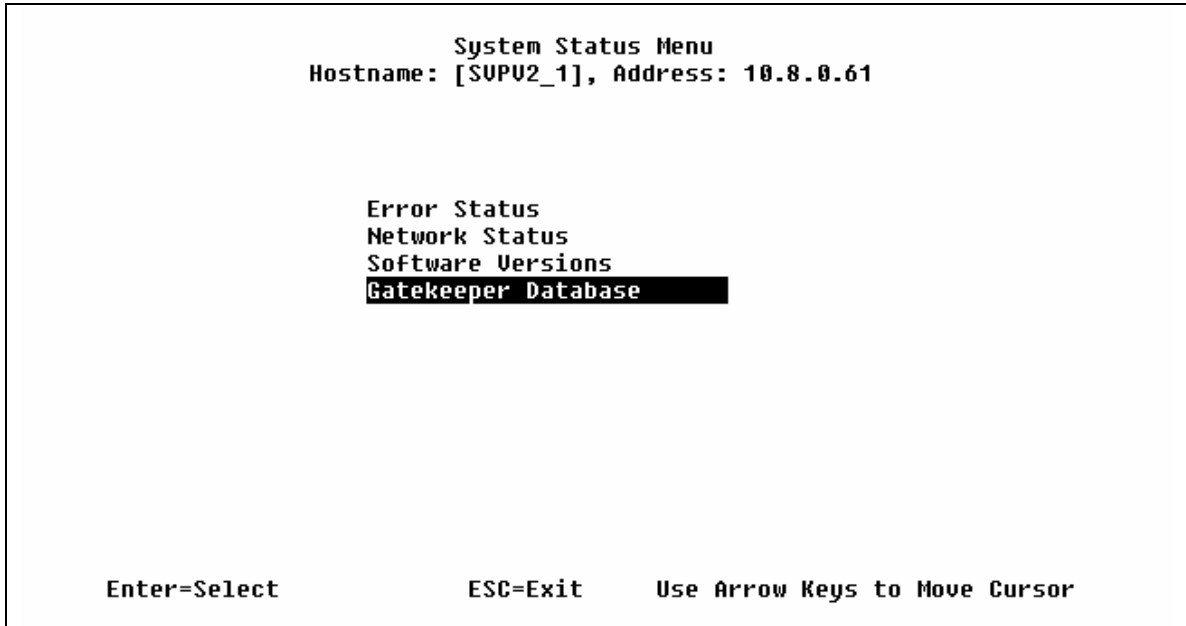
After software updates are obtained from SpectraLink, they must be transferred to the TFTP location in the LAN to update the code used by the NetLink SVP Server(s).



Note that locking the NetLink SVP Server will prevent new calls from starting. All calls in progress will be terminated when the NetLink SVP Server is reset.

7. Troubleshooting via System Status Menu

Information about system alarms, and network status displays on various screens accessed through the **System Status Menu** screen, which is opened from the main menu of the NetLink SVP Server. See the previous sections for directions on how to connect to the NetLink SVP Server and navigate to the **System Status Menu**.



Error Status

Displays alarm and error message information.

Network Status

Displays information about the Ethernet network to which the NetLink SVP Server is connected.

Software Versions

Lists the software version for each SpectraLink component.

Gatekeeper Database

Allows you to view activity of the gatekeeper database.

Options on the System Status Menu provide a window into the real time operation of the components of the system. Use this data to determine system function and to troubleshoot areas that may be experiencing trouble.

7.1 Error Status

The **Error Status** screen displays any alarms that indicate some system malfunction. Some of these alarms are easily remedied and others require a call to SpectraLink's Customer Support Department.

From the **System Status Menu**, select **Error Status**. The screen displays active alarms on the NetLink SVP Server.

The following table displays the list of alarms and a description of the action to take to eliminate the alarm.

Alarm Text	Action
Maximum payload usage reached	Reduce usage, clear alarm
Maximum telephone usage reached	Reduce usage, clear alarm
Maximum access point usage reached	Reduce usage, clear alarm
Maximum call usage reached	Reduce usage, clear alarm
SRP audio delayed	Reduce usage, clear alarm
SRP audio lost	Reduce usage, clear alarm
No IP address	Configure an IP address

Press C to clear all clearable alarms.

7.2 Network Status

The NetLink SVP Server is connected to the Ethernet network, referred to as the LAN or Local Area Network. The information about that connection is provided through the **Network Status** screen.

From the **System Status Menu**, select **Network Status**. The screen displays information about the Ethernet network. This information can help troubleshoot network problems. A sample screen is displayed here.

Network Status							
Hostname: [SUPV2_1], Address: 10.8.0.61							
Ethernet Address: 00:90:7A:00:77:15				Net: 100/Full			
System Uptime: 6 days, 02:34				Max calls: 80			
RX:	bytes	packets	errors	drop	fifo	alignment	multicast
	432891547	4112190	0	0	0	0	1321217
TX:	bytes	packets	errors	drop	fifo	carrier	collisions
	1478261799	1311194	0	0	0	0	0
SUP-II Sockets in Use						(Last / Max):	0 / 10
SUP-II Access Points in Calls						(Last / Max):	0 / 2
SUP-II Telephones in Use						(Last / Max):	0 / 1
SUP-II Telephones in Calls						(Last / Max):	0 / 2
SUP-II SRP Audio						(Delay / Lost):	0 / 0
ESC to Exit							

Ethernet Address – MAC address of the NetLink SVP Server (hexadecimal).

System Uptime – The number of days, hours and minutes since the NetLink SVP Server was last reset.

Net – The type of connection to the Ethernet switch currently utilized. See SVP100 Capacity for more information.



Data is transmitted over SpectraLink components by proprietary technology developed by SpectraLink Corporation. The SpectraLink Radio Protocol (SRP) packets and bytes can be differentiated from other types of transmissions and are used to evaluate system functioning by SpectraLink customer support and engineering personnel.

RX – Ethernet statistics concerning the received packets during System Uptime.

bytes – bytes received

packets – packets received

errors – Sum of all receive errors (long packet, short packet, CRC, overrun, alignment)

drop – packets dropped due to insufficient memory

fifo – overrun occurred during reception

alignment – nonoctet-aligned packets (number of bits NOT divisible by eight)

multicast – packets received with a broadcast or multicast destination address

TX – Ethernet statistics concerning the transmitted packets during System Uptime.

bytes – bytes transmitted

packets – packets transmitted

errors – Sum of all transmit errors (heartbeat, late collision, repeated collision, underrun, carrier)

drop – packets dropped due to insufficient memory

fifo – underrun occurred during transmission

carrier – carrier lost during transmission

collisions – packets deferred (delayed) due to collision

SVP-II Access Points in Use – APs in use by wireless telephones, either in standby or in a call. 'Last' is current, 'Max' is the maximum number in use at one time.

SVP-II Access Points in Calls – APs with wireless telephones in a call.

SVP-II Telephones in Use – wireless telephones in standby or in a call.

SVP-II Telephones in Calls – wireless telephones in a call.

SVP-II SRP Audio (Delay) – SRP audio packets whose transmission was momentarily delayed.

SVP-II SRP Audio (Lost) – SRP audio packets dropped due to insufficient memory resources.

7.3 Software Version

The NetLink SVP Server and wireless telephones utilize SpectraLink Corporation's proprietary software that is controlled and maintained through versioning. The **Software Version** screen provides information about the version currently running on the NetLink SVP Server. This information will help you determine if you are running the most recent version and will assist SpectraLink engineering and/or customer support in troubleshooting software problems.

This screen also displays the model type.

From the **System Status Menu**, select **Software Version**. A sample screen is displayed here.

```
                                Software Version Numbers
                                Hostname: [SVP020_1], Address: 10.8.0.61

SVP Type:                      020
Hardware Versions:             33/02
Factory Page:                  213.001
Downloader:                    213.004 (99cd73ee)
Table of Contents:             173.024 (4553d976)
Functional Code:               174.024 (f4ae1d58)
File System:                   175.024 (4bfc9a09)

                                ESC to Exit
```

Note that the software versions on your system may be different from the versions displayed in the above sample screen.

The table below shows the description, major version numbers, and filenames of the files that are provided when downloading updates.

Name	Major Version Number	Filename
Table of contents	173	svp100.toc
Functional code	174	zvmlinux
File system	175	flashfs

The minor version numbers for these three files must all match, as they do in the screen example (17x.024).

7.4 Gatekeeper Database

The **Gatekeeper Database** screen lists the registered extension numbers and the IP address currently being used by each.

Alias/Phone Number:	RAS IP address	CSA IP address	Expiration (secs)
1500:	10.12.0.12		31
1501:	10.12.0.12		31
1502:	10.12.0.12		31
1503:	10.12.0.12		31
1510:	10.12.0.12		31
1511:	10.12.0.12		31
1520:	10.12.0.12		31
1597:	10.17.130.2		61
1599:	10.12.0.12		31
1700:	10.12.0.12		31
2098:	10.17.130.1		56
GW_0_0_10.12.0.12:	10.12.0.12		31

All

Alias/Phone Number—phone identifier.

RAS IP address—(Registration Admission Status) IP address.

CSA IP address—(Call Signaling Address) IP address.

Expiration (secs)—the number of seconds until the record will be renewed.

A wireless telephone IP address is renewed every 90 seconds.

Press the question mark (shift + ?) to open the H.323 Gatekeeper Database Help screen: The help screen provides information about how to scroll and search the database.

H.323 Gatekeeper Database Help	
ESC q Q x X	Exit
SPACE d f Ctrl-F Ctrl-U	Scroll Down
u b ^B	Scroll Up
r R Ctrl-L ctrl-R	Redisplay
g <	Show the first page
G >	Show the last page
/<search text>	Search
n	Repeat previous search
Search Text Mode	
ESC	Abort search
ENTER RETURN	Perform search
Ctrl-A HOME	Go to the first character
Ctrl-E END	Go to the last character
Ctrl-H BACKSPACE	Erase character behind cursor
Ctrl-D DELETE	Erase character under cursor
Ctrl-B <-	Move cursor left
Ctrl-F ->	Move cursor right
Ctrl-K	Erase from cursor to end
Ctrl-U	Erase from beginning to cursor
Ctrl-L	Redisplay
ESC=continue	

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